



23500170101.txt  
SUBSTITUTE SEQUENCE LISTING

<110> Clark, Theodore G.  
Dickerson, Jr., Harry W.  
Lin, Tian-Long

<120> DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF  
ICHTHYOPHTHIRIUS

<130> 235.00170101

<140> 09/497,967

<141> 2000-02-04

<150> 60/131,121

<151> 1999-04-27

<150> 60/118,634

<151> 1999-02-04

<150> 60/122,372

<151> 1999-03-02

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<151> 1999-03-17

<160> 102

<170> PatentIn Ver. 2.1

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<213> Ichthyophthirius multifiliis

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<212> DNA  
<213> Ichthyophthirius multifiliis

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&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 4

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&lt;211&gt; 1404

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

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55kd i-antigen coding region

&lt;400&gt; 5

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Leu Thr Asp Val Gly Ala Ala Asp Leu Gly Thr Cys Val Asn Cys Arg
          35          40          45
Pro Asn Phe Tyr Tyr Asn Gly Gly Ala Ala Gln Gly Glu Ala Asn Gly
          50          55          60
Asn Gln Pro Phe Ala Ala Asn Asn Ala Ala Arg Gly Ile Cys Val Pro
          65          70          75
Cys Gln Ile Asn Arg Val Gly Ser Val Thr Asn Ala Gly Asp Leu Ala
          85          90          95
Thr Leu Ala Thr Gln Cys Ser Thr Gln Cys Pro Thr Gly Thr Ala Leu
          100         105
Asp Asp Gly Val Thr Asp Val Phe Asp Arg Ser Ala Ala Gln Cys Val
          115         120         125
Lys Cys Lys Pro Asn Phe Tyr Tyr Asn Gly Gly Ser Pro Gln Gly Glu
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Ala Pro Gly Val Gln Val Phe Ala Ala Gly Ala Ala Ala Ala Gly Val
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Ala Ala Val Thr Ser Gln Cys Val Pro Cys Gln Leu Asn Lys Asn Asp
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Ser Pro Ala Thr Ala Gly Ala Gln Ala Asn Leu Ala Thr Gln Cys Ser
          180         185         190
Asn Gln Cys Pro Thr Gly Thr Val Leu Asp Asp Gly Val Thr Leu Val
          195         200         205
Phe Asn Thr Ser Ala Thr Leu Cys Val Lys Cys Arg Pro Asn Phe Tyr
          210         215         220
Tyr Asn Gly Gly Ser Pro Gln Gly Glu Ala Pro Gly Val Gln Val Phe
          225         230         235         240
Ala Ala Gly Ala Ala Ala Ala Gly Val Ala Ala Val Thr Ser Gln Cys
          245         250         255
Val Pro Cys Gln Ile Asn Lys Asn Asp Ser Pro Ala Thr Ala Gly Ala
          260         265         270
Gln Ala Asn Leu Ala Thr Gln Cys Ser Thr Gln Cys Pro Thr Gly Thr
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Ala Ile Gln Asp Gly Val Thr Leu Val Phe Ser Asn Ser Ser Thr Gln
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 325 330 335  
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 340 345 350  
 Cys Pro Ala Gly Thr Val Leu Asp Asp Gly Thr Ser Thr Asn Phe Val  
 355 360 365  
 Ala Ser Ala Thr Glu Cys Thr Lys Cys Ser Ala Gly Phe Phe Ala Ser  
 370 375 380  
 Lys Thr Thr Gly Phe Thr Ala Gly Thr Asp Thr Cys Thr Glu Cys Thr  
 385 390 395 400  
 Lys Lys Leu Thr Ser Gly Ala Thr Ala Lys Val Tyr Ala Glu Ala Thr  
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 <213> Ichthyophthirius multifiliis

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 Gly Gln Val Asp Asp Leu Gly Thr Pro Ala Asn Cys Val Asn Cys Gln  
 35 40 45  
 Lys Asn Phe Tyr Tyr Asn Asn Ala Ala Ala Phe Val Pro Gly Ala Ser  
 50 55 60  
 Thr Cys Thr Pro Cys Pro Gln Lys Lys Asp Ala Gly Ala Gln Pro Asn  
 65 70 75 80  
 Pro Pro Ala Thr Ala Asn Leu Val Thr Gln Cys Asn Val Lys Cys Pro  
 85 90 95  
 Ala Gly Thr Ala Ile Ala Gly Gly Ala Thr Asp Tyr Ala Ala Ile Ile  
 100 105 110  
 Thr Glu Cys Val Asn Cys Arg Ile Asn Phe Tyr Asn Glu Asn Ala Pro  
 115 120 125  
 Asn Phe Asn Ala Gly Ala Ser Thr Cys Thr Ala Cys Pro Val Asn Arg  
 130 135 140  
 Val Gly Gly Ala Leu Thr Ala Gly Asn Ala Ala Thr Ile Val Ala Gln  
 Page 5

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 Tyr Tyr Leu Leu  
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23500170101.txt

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 <213> Ichthyophthirius multifiliis

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 35 40 45  
 Asn Asn Ala Ala Arg Gly Ile Cys Val Pro Cys Gln Ile Asn Arg Val  
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<210> 9  
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 35 40 45  
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 Page 7

35

40

45

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&lt;210&gt; 11

&lt;211&gt; 69

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 11

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Gly Asn Phe Glu Ala Gly Lys Ser Gln Cys Leu Lys Cys Pro Val Ser  
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Gln Cys Leu Thr Thr  
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&lt;210&gt; 12

&lt;211&gt; 72

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 12

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Gln Lys Val Gln Cys Ala Ser Thr  
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&lt;210&gt; 13

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 13

Phe Leu Ser Ile Ser Leu Leu Phe Ile Ser Phe Tyr Leu Leu  
 Page 8



1

5

10

&lt;210&gt; 14

&lt;211&gt; 23

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 14

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&lt;210&gt; 15

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&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 15

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&lt;210&gt; 16

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 16

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&lt;210&gt; 17

&lt;211&gt; 20

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&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 17

Gln Cys Asp Phe Ala Asn Phe Leu Ser Ile Ser Leu Leu Leu Ile Ser  
1 5 10 15Tyr Tyr Leu Leu  
20

&lt;210&gt; 18

&lt;211&gt; 33

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 18

Lys Val Tyr Ala Glu Ala Thr Gln Lys Val Gln Cys Ala Ser Thr Thr  
1 5 10 15Phe Ala Lys Phe Leu Ser Ile Ser Leu Leu Phe Ile Ser Phe Tyr Leu  
20 25 30

Leu

<210> 19  
 <211> 60  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 19  
 atgaaaaata atattttagt aatattgatt atttcattat ttatcaatta aattaaatct 60

<210> 20  
 <211> 60  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 20  
 taatgtgatt tcgctaattt tttatcaatt tccttattat tgatttctta ttatttatta 60

<210> 21  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: antisense  
 primer

<400> 21  
 agcagcacct acatcagtca atcc 24

<210> 22  
 <211> 17  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: universal  
 primer

<400> 22  
 gtaaaacgac ggccagt 17

<210> 23  
 <211> 40  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: EPBdT18  
 primer

<400> 23  
 gcgaattctg caggatccaa actttttttt tttttttttt 40

<210> 24

<211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: forward primer  
  
 <400> 24  
 gtgtcgacag caggtactga tacatg 26  
  
 <210> 25  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: forward primer  
  
 <400> 25  
 cgaaaacagt ggtggtagta cctt 24  
  
 <210> 26  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: reverse primer  
  
 <400> 26  
 gcgaattctg caggatccaa ac 22  
  
 <210> 27  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligonucleotide probe  
  
 <400> 27  
 agcagcacca acatcagtca aacc 24  
  
 <210> 28  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: forward primer  
  
 <400> 28  
 atggtaatta acctttcgca gcaaataa 28

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<210> 29  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: reverse primer

<400> 29  
 ggtctgcatt taacacataa 20

<210> 30  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: reverse primer

<400> 30  
 agatacatca gtatacgaaa 20

<210> 31  
 <211> 4  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primary structure motif

<220>  
 <221> UNSURE  
 <222> (2)..(3)  
 <223> amino acid

<400> 31  
 Cys Xaa Xaa Cys  
 1

<210> 32  
 <211> 5  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primary structure motif

<220>  
 <221> UNSURE  
 <222> (2)..(4)  
 <223> amino acid

<400> 32  
 Cys Xaa Xaa Xaa Cys  
 1 5

<210> 33  
 <211> 53  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: repeating  
 primary structure motif

<220>  
 <221> UNSURE  
 <222> (2)..(3)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (5)..(24)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (26)..(28)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (30)..(49)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (51)..(52)  
 <223> amino acid

<400> 33  
 Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 1 5 10 15  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Cys Xaa Xaa Xaa  
 20 25 30  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 35 40 45  
 Xaa Cys Xaa Xaa Cys  
 50

<210> 34  
 <211> 8  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: i-antigen  
 P-loop domain

<220>  
 <221> UNSURE  
 <222> (2)..(5)

&lt;400&gt; 34

Gly Xaa Xaa Xaa Xaa Gly Lys Ser  
1 5

&lt;210&gt; 35

&lt;211&gt; 24

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: sense primer

&lt;400&gt; 35

atgaaataya ayattttatt aatt

24

&lt;210&gt; 36

&lt;211&gt; 8

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 36

Met Lys Tyr Asn Ile Leu Leu Thr  
1 5

&lt;210&gt; 37

&lt;211&gt; 24

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: antisense  
primer

&lt;400&gt; 37

aaataataar gaaatmgata aaaa

24

&lt;210&gt; 38

&lt;211&gt; 8

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 38

Phe Leu Ser Ile Ser Leu Leu Phe  
1 5

&lt;210&gt; 39

&lt;211&gt; 26

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: antisense  
primer

&lt;400&gt; 39

tgctcgagaa tctgttgctc cacctg

26

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<210> 40  
<211> 52  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: forward primer

<400> 40  
ccagtga gca gaggtagcag gactcgagct caagcccccc cccccccccc cc 52

<210> 41  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: forward primer

<400> 41  
gaggactcga gctcaagc 18

<210> 42  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: reverse primer

<400> 42  
aactcgagta ccagcagggc atttaac 27

<210> 43  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 43  
cacaccttgt ccggcaatta aac 23

<210> 44  
<211> 1410  
<212> DNA  
<213> Ichthyophthirius multifiliis

<400> 44  
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gctaattgtc ctgttggaac tgaaactaac acagccggat aagttgatga tctaggaact 120  
cctgcaaatt gtgttaattg ttagaaaaaac ttttattata ataatgctgc tgctttcgtt 180  
cctggtgcta gtacgtgtac accttggtcca taaaaaaaag atgctggtgc ttaaccaaatt 240  
ccacctgcta ctgctaattt agtcacataa tgtaacgtta aatgccctgc tggtagcgca 300  
attgcaggtg gagcaacaga ttatgcagca ataatcacag aatgtgttaa ttgtagaatt 360

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aatttttata atgaaaatgc tccaaatttt aatgcagggtg ctagtacatg cacagcttgt 420
ccggtaaaca gagttgggtgg tgcattgact gctggtaatg ccgctaccat agtcgcataa 480
tgtaacgtcg catgtcctac tgggtactgca cttgatgatg gagtaactac tgattatggt 540
agatcattca cagaatgtgt taaatgtaga ctttaactttt actataatgg taataatggt 600
aatactcctt tcaatccagg taaaagttaa tgcacacctt gtccggcaat taaacctgct 660
aatgttgctt aagctacttt aggtaatgat gctacaataa ccgcataatg taacgttgca 720
tgccctgatg gtactataag tgctgctgga gtaaataaatt gggtagcaca aaacactgaa 780
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agtacatgcc taccttgccc agcaaataaa gattatgggtg ctgaagccac tgcagggtgt 900
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gaatgccctg ctggtactgt actcaccgat ggaacaacat ctacttataa ataagcagca 1200
tctgaatgtg ttaaattgtc tgccaacttt tatactacaa aataaactga ttgggtagca 1260
cgtattgata catgtactag ttgtaataaa aaattaaactt ctggcgctga agctaattta 1320
cctgaatctg ctaaaaaaaa tatataatgt gatttcgcta attttttatc aatttcctta 1380
ttattgattt cttattattt attatgatga                                     1410

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<210> 45  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: forward primer

<400> 45  
 ccgaattctc tgggactgca cttgatgatg gag 33

<210> 46  
 <211> 8  
 <212> PRT  
 <213> Ichthyophthirius multifiliis

<400> 46  
 Gly Thr Ala Leu Asp Asp Gly Val  
 1 5

<210> 47  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: reverse primer

<400> 47  
 gtggatccag tacatgttac artacctgc 29

<210> 48  
 <211> 7  
 <212> PRT  
 <213> Ichthyophthirius multifiliis

<400> 48  
 Ala Gly Thr Asp Thr Cys Thr



1

5

<210> 49  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: reverse primer

<400> 49  
 gtggatccrc cagaagttaa ttttttakta c 31

<210> 50  
 <211> 9  
 <212> PRT  
 <213> Ichthyophthirius multifiliis

<400> 50  
 Cys Thr Lys Lys Leu Thr Ser Gly Ala  
 1 5

<210> 51  
 <211> 32  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: reverse primer

<400> 51  
 gtggatccaa ggaaatygat aaaaawttag cg 32

<210> 52  
 <211> 9  
 <212> PRT  
 <213> Ichthyophthirius multifiliis

<400> 52  
 Phe Ala Lys Phe Leu Ser Ile Ser Leu  
 1 5

<210> 53  
 <211> 1404  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: synthetic G5 proline mutant i-antigen

<400> 53  
 atgaagaaca acatcccggg gatcctgac atctctctgt tcatcaacca gatcaagtct 60  
 gctaactgtc ctgtgggaac cgagaccaac accgctggac aggtggacga cctgggaacc 120  
 cctgctaact gtgtgaactg tcagaagaac ttctactaca acaacgctgc tgctttcgtg 180  
 cctggagctt ctacctgtac ccctgtcct cagaagaagg acgctggagc tcagcctaac 240

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cctcctgcta ccgctaacct ggtgacccag tgtaacgtga agtgtcctgc tgggaaccgct 300
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aacttctaca acgagaacgc tcctaacttc aacgctggag cttctacctg taccgcttgt 420
cctgtgaacc gtgtgggagg agctctgacc gctggaaacg ctgctaccat cgtggctcag 480
tgtaacgtgg cttgtcctac cggaaccgct ctggacgacg gagtgaccac cgactacgtg 540
cgctctttca ccgagtgtgt gaagtgtcgc ctgaacttct actacaacgg aaacaacgga 600
aacacccctt tcaaccctgg aaagtctcag tgtaccctt gtcctgctat caagcctgct 660
aacgtggctc aggtaccctt gggaaacgac gctaccatca ccgctcagtg taacgtggct 720
tgtctgacg gaaccatctc tgctgtgga gtgaacaact ggggtggctca gaacaccgag 780
tgtaccaact gtgctcctaa cttctacaac aacaacgctc ctaacttcaa ccctggaaac 840
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cctgagtctg ctaagaagaa catccagtgt gacttcgcta acttcctgct tatctctctg 1380
ctgctgatct cttactacct gctg                                     1404

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<210> 54  
 <211> 468  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: synthetic G5  
 proline mutant antigen protein

<400> 54  
 Met Lys Asn Asn Ile Pro Val Ile Leu Ile Ile Ser Leu Phe Ile Asn  
 1 5 10 15  
 Gln Ile Lys Ser Ala Asn Cys Pro Val Gly Thr Glu Thr Asn Thr Ala  
 20 25 30  
 Gly Gln Val Asp Asp Leu Gly Thr Pro Ala Asn Cys Val Asn Cys Gln  
 35 40 45  
 Lys Asn Phe Tyr Tyr Asn Asn Ala Ala Ala Phe Val Pro Gly Ala Ser  
 50 55 60  
 Thr Cys Thr Pro Cys Pro Gln Lys Lys Asp Ala Gly Ala Gln Pro Asn  
 65 70 75 80  
 Pro Pro Ala Thr Ala Asn Leu Val Thr Gln Cys Asn Val Lys Cys Pro  
 85 90 95  
 Ala Gly Thr Ala Ile Ala Gly Gly Ala Thr Asp Tyr Ala Ala Ile Ile  
 100 105 110  
 Thr Glu Cys Val Asn Cys Arg Ile Asn Phe Tyr Asn Glu Asn Ala Pro  
 115 120 125  
 Asn Phe Asn Ala Gly Ala Ser Thr Cys Thr Ala Cys Pro Val Asn Arg  
 130 135 140  
 Val Gly Gly Ala Leu Thr Ala Gly Asn Ala Ala Thr Ile Val Ala Gln  
 145 150 155 160

Cys Asn Val Ala Cys Pro Thr Gly Thr Ala Leu Asp Asp Gly Val Thr  
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165	170	175
Thr Asp Tyr Val Arg Ser Phe Thr Glu Cys Val Lys Cys Arg Leu Asn	180	185
Phe Tyr Tyr Asn Gly Asn Asn Gly Asn Thr Pro Phe Asn Pro Gly Lys	195	200
Ser Gln Cys Thr Pro Cys Pro Ala Ile Lys Pro Ala Asn Val Ala Gln	210	215
Ala Thr Leu Gly Asn Asp Ala Thr Ile Thr Ala Gln Cys Asn Val Ala	225	230
Cys Pro Asp Gly Thr Ile Ser Ala Ala Gly Val Asn Asn Trp Val Ala	245	250
Gln Asn Thr Glu Cys Thr Asn Cys Ala Pro Asn Phe Tyr Asn Asn Asn	260	265
Ala Pro Asn Phe Asn Pro Gly Asn Ser Thr Cys Leu Pro Cys Pro Ala	275	280
Asn Lys Asp Tyr Gly Ala Glu Ala Thr Ala Gly Gly Ala Ala Thr Leu	290	295
Ala Lys Gln Cys Asn Ile Ala Cys Pro Asp Gly Thr Ala Ile Ala Ser	305	310
Gly Ala Thr Asn Tyr Val Ile Leu Gln Thr Glu Cys Leu Asn Cys Ala	325	330
Ala Asn Phe Tyr Phe Asp Gly Asn Asn Phe Gln Ala Gly Ser Ser Arg	340	345
Cys Lys Ala Cys Pro Ala Asn Lys Val Gln Gly Ala Val Ala Thr Ala	355	360
Gly Gly Thr Ala Thr Leu Ile Ala Gln Cys Ala Leu Glu Cys Pro Ala	370	375
Gly Thr Val Leu Thr Asp Gly Thr Thr Ser Thr Tyr Lys Gln Ala Ala	385	390
Ser Glu Cys Val Lys Cys Ala Ala Asn Phe Tyr Thr Thr Lys Gln Thr	405	410
Asp Trp Val Ala Gly Ile Asp Thr Cys Thr Ser Cys Asn Lys Lys Leu	420	425
Thr Ser Gly Ala Glu Ala Asn Leu Pro Glu Ser Ala Lys Lys Asn Ile	435	440
Gln Cys Asp Phe Ala Asn Phe Leu Ser Ile Ser Leu Leu Leu Ile Ser	450	455
Tyr Tyr Leu Leu	465	

<210> 55  
 <211> 72  
 <212> PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 55

Cys Pro Val Gly Thr Glu Thr Asn Thr Ala Gly Gln Val Asp Asp Leu  
 1 5 10 15  
 Gly Thr Pro Ala Asn Cys Val Asn Cys Gln Lys Asn Phe Tyr Tyr Asn  
 20 25 30  
 Asn Ala Ala Ala Phe Val Pro Gly Ala Ser Thr Cys Thr Pro Cys Pro  
 35 40 45  
 Gln Lys Lys Asp Ala Gly Ala Gln Pro Asn Pro Pro Ala Thr Ala Asn  
 50 55 60  
 Leu Val Thr Gln Cys Asn Val Lys  
 65 70

&lt;210&gt; 56

&lt;211&gt; 70

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 56

Cys Pro Ala Gly Thr Ala Ile Ala Gly Gly Ala Thr Asp Tyr Ala Ala  
 1 5 10 15  
 Ile Ile Thr Glu Cys Val Asn Cys Arg Ile Asn Phe Tyr Asn Glu Asn  
 20 25 30  
 Ala Pro Asn Phe Asn Ala Gly Ala Ser Thr Cys Thr Ala Cys Pro Val  
 35 40 45  
 Asn Arg Val Gly Gly Ala Leu Thr Ala Gly Asn Ala Ala Thr Ile Val  
 50 55 60  
 Ala Gln Cys Asn Val Ala  
 65 70

&lt;210&gt; 57

&lt;211&gt; 76

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 57

Cys Pro Thr Gly Thr Ala Leu Asp Asp Gly Val Thr Thr Asp Tyr Val  
 1 5 10 15  
 Arg Ser Phe Thr Glu Cys Val Lys Cys Arg Leu Asn Phe Tyr Tyr Asn  
 20 25 30  
 Gly Asn Asn Gly Asn Thr Pro Phe Asn Pro Gly Lys Ser Gln Cys Thr  
 35 40 45  
 Pro Cys Pro Ala Ile Lys Pro Ala Asn Val Ala Gln Ala Thr Leu Gly  
 50 55 60  
 Asn Asp Ala Thr Ile Thr Ala Gln Cys Asn Val Ala  
 65 70 75

&lt;210&gt; 58

&lt;211&gt; 71

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 58

Cys Pro Asp Gly Thr Ile Ser Ala Ala Gly Val Asn Asn Trp Val Ala  
1 5 10 15Gln Asn Thr Glu Cys Thr Asn Cys Ala Pro Asn Phe Tyr Asn Asn Asn  
20 25 30Ala Pro Asn Phe Asn Pro Gly Asn Ser Thr Cys Leu Pro Cys Pro Ala  
35 40 45Asn Lys Asp Tyr Gly Ala Glu Ala Thr Ala Gly Gly Ala Ala Thr Leu  
50 55 60Ala Lys Gln Cys Asn Ile Ala  
65 70

&lt;210&gt; 59

&lt;211&gt; 70

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 59

Cys Pro Asp Gly Thr Ala Ile Ala Ser Gly Ala Thr Asn Tyr Val Ile  
1 5 10 15Leu Gln Thr Glu Cys Leu Asn Cys Ala Ala Asn Phe Tyr Phe Asp Gly  
20 25 30Asn Asn Phe Gln Ala Gly Ser Ser Arg Cys Lys Ala Cys Pro Ala Asn  
35 40 45Lys Val Gln Gly Ala Val Ala Thr Ala Gly Gly Thr Ala Thr Leu Ile  
50 55 60Ala Gln Cys Ala Leu Glu  
65 70

&lt;210&gt; 60

&lt;211&gt; 72

&lt;212&gt; PRT

&lt;213&gt; Ichthyophthirius multifiliis

&lt;400&gt; 60

Cys Pro Ala Gly Thr Val Leu Thr Asp Gly Thr Thr Ser Thr Tyr Lys  
1 5 10 15Gln Ala Ala Ser Glu Cys Val Lys Cys Ala Ala Asn Phe Tyr Thr Thr  
20 25 30Lys Gln Thr Asp Trp Val Ala Gly Ile Asp Thr Cys Thr Ser Cys Asn  
35 40 45Lys Lys Leu Thr Ser Gly Ala Glu Ala Asn Leu Pro Glu Ser Ala Lys  
50 55 60

Lys Asn Ile Gln Cys Asp Phe Ala

65

70

&lt;210&gt; 61

&lt;211&gt; 409

&lt;212&gt; PRT

<213> *Ichthyophthirius multifiliis*

&lt;400&gt; 61

Ala Val Pro Cys Pro Asp Gly Thr Gln Thr Gln Ala Gly Leu Thr Asp  
 1 5 10 15  
 Val Gly Ala Ala Asp Leu Gly Thr Cys Val Asn Cys Arg Pro Asn Phe  
 20 25 30  
 Tyr Tyr Asn Gly Gly Ala Ala Gln Gly Glu Ala Asn Gly Asn Gln Pro  
 35 40 45  
 Phe Ala Ala Asn Asn Ala Ala Arg Gly Ile Cys Val Pro Cys Gln Ile  
 50 55 60  
 Asn Arg Val Gly Ser Val Thr Asn Ala Gly Asp Leu Ala Thr Leu Ala  
 65 70 75 80  
 Thr Gln Cys Ser Thr Gln Cys Pro Thr Gly Thr Ala Leu Asp Asp Gly  
 85 90 95  
 Val Thr Asp Val Phe Asp Arg Ser Ala Ala Gln Cys Val Lys Cys Lys  
 100 105 110  
 Pro Asn Phe Tyr Tyr Asn Gly Gly Ser Pro Gln Gly Glu Ala Pro Gly  
 115 120 125  
 Val Gln Val Phe Ala Ala Gly Ala Ala Ala Ala Gly Val Ala Ala Val  
 130 135 140  
 Thr Ser Gln Cys Val Pro Cys Gln Leu Asn Lys Asn Asp Ser Pro Ala  
 145 150 155 160  
 Thr Ala Gly Ala Gln Ala Asn Leu Ala Thr Gln Cys Ser Asn Gln Cys  
 165 170 175  
 Pro Thr Gly Thr Val Leu Asp Asp Gly Val Thr Leu Val Phe Asn Thr  
 180 185 190  
 Ser Ala Thr Leu Cys Val Lys Cys Arg Pro Asn Phe Tyr Tyr Asn Gly  
 195 200 205  
 Gly Ser Pro Gln Gly Glu Ala Pro Gly Val Gln Val Phe Ala Ala Gly  
 210 215 220  
 Ala Ala Ala Ala Gly Val Ala Ala Val Thr Ser Gln Cys Val Pro Cys  
 225 230 235 240  
 Gln Ile Asn Lys Asn Asp Ser Pro Ala Thr Ala Gly Ala Gln Ala Asn  
 245 250 255  
 Leu Ala Thr Gln Cys Ser Thr Gln Cys Pro Thr Gly Thr Ala Ile Gln  
 260 265 270  
 Asp Gly Val Thr Leu Val Phe Ser Asn Ser Ser Thr Gln Cys Ser Gln  
 275 280 285

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Cys Ile Ala Asn Tyr Phe Phe Asn Gly Asn Phe Glu Ala Gly Lys Ser  
 290 295 300  
 Gln Cys Leu Lys Cys Pro Val Ser Lys Thr Thr Pro Ala His Ala Pro  
 305 310 315 320  
 Gly Asn Thr Ala Thr Gln Ala Thr Gln Cys Leu Thr Thr Cys Pro Ala  
 325 330 335  
 Gly Thr Val Leu Asp Asp Gly Thr Ser Thr Asn Phe Val Ala Ser Ala  
 340 345 350  
 Thr Glu Cys Thr Lys Cys Ser Ala Gly Phe Phe Ala Ser Lys Thr Thr  
 355 360 365  
 Gly Phe Thr Ala Gly Thr Asp Thr Cys Thr Glu Cys Thr Lys Lys Leu  
 370 375 380  
 Thr Ser Gly Ala Thr Ala Lys Val Tyr Ala Glu Ala Thr Gln Lys Val  
 385 390 395 400  
 Gln Cys Ala Ser Thr Thr Phe Ala Lys  
 405

&lt;210&gt; 62

&lt;211&gt; 399

&lt;212&gt; PRT

&lt;213&gt; Giardia lamblia virus

&lt;400&gt; 62

Ala Val Asp Cys Gln Gly Ser Ala Gly Tyr Tyr Thr Asp Asp Ser Val  
 1 5 10 15  
 Ser Asp Ala Lys Glu Cys Lys Lys Cys Asn Ala Pro Cys Thr Ala Cys  
 20 25 30  
 Ala Gly Thr Ala Asp Lys Cys Thr Lys Cys Asp Ala Asn Gly Ala Ala  
 35 40 45  
 Pro Tyr Leu Lys Lys Thr Asn Pro Ser Asp Pro Thr Gly Thr Cys Val  
 50 55 60  
 Ser Ala Val Asp Cys Gln Gly Ser Ala Gly Tyr Tyr Thr Asp Asp Ser  
 65 70 75 80  
 Val Ser Asp Ala Lys Glu Cys Lys Lys Cys Ala Glu Gly Gln Lys Pro  
 85 90 95  
 Asn Thr Ala Gly Thr Gln Cys Phe Ser Cys Ser Asp Ala Asn Cys Glu  
 100 105 110  
 Arg Cys Asp Gln Asn Asp Val Cys Ala Arg Cys Ser Thr Gly Ala Pro  
 115 120 125  
 Pro Glu Asn Gly Lys Cys Pro Ala Ala Thr Pro Gly Cys His Ser Ser  
 130 135 140  
 Cys Asp Gly Cys Thr Glu Asn Ala Met Thr Asn Gln Ala Asp Lys Cys  
 145 150 155 160  
 Thr Gly Cys Lys Glu Gly Arg Tyr Leu Lys Pro Glu Ser Ala Ala Gly  
 165 170 175

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Gln Ser Gly Thr Cys Leu Thr Ala Glu Glu Cys Thr Ser Asp Thr Thr  
180 185 190  
His Phe Thr Lys Glu Lys Ala Gly Asp Ser Lys Gly Met Cys Leu Pro  
195 200 205  
Cys Ser Asp Ala Thr His Gly Ile Ala Gly Cys Lys Lys Cys Ala Leu  
210 215 220  
Lys Thr Leu Ser Gly Glu Ala Glu Ser Thr Val Val Cys Ser Glu Cys  
225 230 235 240  
Thr Asp Lys Trp Leu Thr Pro Ser Gly Asn Ala Cys Leu Asp Asn Cys  
245 250 255  
Pro Ala Gly Thr Tyr Pro Asn Asp Asn Asn Leu Cys Thr Ser Cys His  
260 265 270  
Asp Thr Cys Ala Glu Cys Asn Gly Asn Ala Asp Arg Ala Ser Cys Thr  
275 280 285  
Ala Cys Tyr Pro Gly Tyr Ser Leu Leu Tyr Gly Ser Cys Thr Ala Gly  
290 295 300  
Thr Cys Val Lys Glu Cys Thr Gly Ala Phe Gly Ala Asn Cys Ala Asp  
305 310 315 320  
Gly Gln Cys Thr Ala Asp Val Gly Gly Ala Lys Tyr Cys Ala Gln Cys  
325 330 335  
Lys Asp Gly Tyr Ala Pro Ile Asp Gly Ile Cys Thr Ala Val Ala Ala  
340 345 350  
Ala Gly Arg Thr Asn Val Cys Thr Ala Ala Asp Gly Thr Cys Thr Lys  
355 360 365  
Cys Ala Gly Glu Tyr Thr Leu Met Ser Gly Gly Cys Tyr Gly Val Ala  
370 375 380  
Lys Leu Pro Gly Lys Ser Val Cys Thr Leu Ala Ser Asn Gly Lys  
385 390 395

<210> 63  
<211> 5  
<212> PRT  
<213> Ichthyophthirius multifiliis

<400> 63  
Val Asn Ile His Gln  
1 5

<210> 64  
<211> 77  
<212> DNA  
<213> Ichthyophthirius multifiliis

<400> 64  
gtaaatatcc attaatgaag cttcgaaaac agtggtggta gtaccttatt catgcttgaa 60  
gtatttagaa tcaagag 77



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<210> 65  
 <211> 33  
 <212> PRT  
 <213> Ichthyophthirius multifiliis

<400> 65  
 Lys Val Tyr Ala Glu Ala Thr Gln Lys Val Gln Cys Ala Ser Thr Thr  
   1                  5                  10                  15  
 Phe Ala Lys Phe Leu Ser Ile Ser Leu Leu Phe Ile Ser Phe Tyr Leu  
           20                  25                  30  
 Leu

<210> 66  
 <211> 202  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 66  
 aaagtatatg ctgaagctac tcaaaaagta taatgcgctt ccactacttt cgctaaattt 60  
 ttatcgattt ccttattatt tatttctttc tatttattgt gatgaataaa ataattcata 120  
 ttattttatt tttttatttt atgtttataa attaaaaaat agataaaaatt taaaatata 180  
 taaaaataat tttttatata aa 202

<210> 67  
 <211> 199  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 67  
 aaagtatatg ctgaagctac tcaaaaagta taatgcgctt ccactacttt cgctaaattt 60  
 ttatcgattt ccttattatt tatttctttc tatttattgt gattaataaa ataattcata 120  
 ttattttatt tttttatttt atgtttataa attaaaaaat agataaaaatt taaaatata 180  
 taaaaaaaaa aaaaaaaaaa 199

<210> 68  
 <211> 162  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 68  
 aaagtatatg ctgaagctac tcaaaaagta taatgcgctt ccactacttt cgctaaattt 60  
 ttatcgattt ccttattatt tatttctttc tatttattgt gatgaataaa ataattcata 120  
 ttattttatt tttttatttt atgtttataa attaaaaaat ag 162

<210> 69  
 <211> 119  
 <212> DNA  
 <213> Ichthyophthirius multifiliis

<400> 69  
 aaagtatatg ctgaagctac tcaaaaagta taatgcgctt ccactacttt cgctaaattt 60  
 ttatcgattt ccttattatt tatttctttc tatttattgt gatgaataaa ataattcat 119

<210> 70

<211> 117

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 70

atgggaattc aaatgaagaa caacatcctg gtgacccctga tcattctctt gttcatcaac 60  
cagatcaagt ctgctaactg tcctgtggga accgagacca acaccgctgg acaggtg 117

<210> 71

<211> 104

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 71

ctccaggcac gaaagcagca gcgttggtgt agtagaagtt cttctgacag ttcacacagt 60  
tagcaggggt tcccaggctg tccacctgct cagcgggtgt ggctc 104

<210> 72

<211> 100

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 72

cgctgctgct ttcgtgcctg gagcttctac ctgtaccctt tgcctcaga agaaggacgc 60  
tggagctcag cctaaccctc ctgctaccgc taacctgggtg 100

<210> 73

<211> 95

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 73

gatgatagca gcgtagtcgg tagctcctcc agcgatagcg gttccagcag gacacttcac 60  
gttacactgg gtcaccaggt tagcggtagc aggag 95

<210> 74

<211> 138

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
oligonucleotide primers

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<400> 74  
gctaccgact acgctgctat catcaccgag tgtgtgaact gtcgcatcaa cttctacaac 60  
gagaacgctc ctaacttcaa cgctggagct tctacctgta ccgcttgtcc tgtgaaccgc 120  
gtgggaggag ctctgacc 138

<210> 75  
<211> 123  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 75  
ggtgaaagag cgcacgtagt cgggtggcac tccgtcgtcc agagcggttc cggtaggaca 60  
agccacgtta cactgagcca cgatggtagc agcgtttcca gcggtcagag ctctctccac 120  
gcg 123

<210> 76  
<211> 99  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 76  
gactacgtgc gctctttcac cgagtgtgtg aagtgtcgcc tgaacttcta ctacaacgga 60  
aacaacggaa acaccccttt caaccctgga aagtctcag 99

<210> 77  
<211> 95  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 77  
gtgatggtag cgtcgtttcc cagggtagcc tgagccacgt tagcaggctt gatagcagga 60  
caaggggtac actgagactt tccaggggtg aaagg 95

<210> 78  
<211> 94  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 78  
gggaaacgac gctaccatca ccgctcagtg taacgtggct tgtcctgacg gaaccatctc 60  
tgctgctgga gtgaacaact ggggtggctca gaac 94

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<210> 79
<211> 100
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
        oligonucleotide primers

<400> 79
cagacaggta gagtttccag ggttgaagtt aggagcgttg ttgttgtaga agttaggagc 60
acagttggta cactcgggtg tctgagccac ccagttgttc                        100

<210> 80
<211> 89
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
        oligonucleotide primers

<400> 80
ccctggaaac tctacctgtc tgccttgtcc tgctaacaag gactacggag ctgaggctac 60
cgctggagga gctgctaccc tggctaagc                                89

<210> 81
<211> 90
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
        oligonucleotide primers

<400> 81
ggtctgcagg atcacgtagt tggtagctcc agaagcgata gcggttccgt caggacaagc 60
gatgttacac tgcttagcca gggtagcagc                                90

<210> 82
<211> 95
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
        oligonucleotide primers

<400> 82
caactacgtg atcctgcaga ccgagtgtct gaactgtgct gctaacttct acttcgacgg 60
aaacaacttc caggctggat ctctcgctg taagg                                95

<210> 83
<211> 92
<212> DNA
<213> Artificial Sequence

<220>

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<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 83  
gagcgatcag ggtagcggtt cctccagcgg tagccacagc tccctgcacc ttgttagcag 60  
gacaagcctt acagcgagaa gatccagcct gg 92

<210> 84  
<211> 94  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 84  
gaaccgctac cctgatcgct cagtgtgctc tggagtgtcc tgctggaacc gtgctgaccg 60  
acggaaccac ctctacctac aagcaggctg cttc 94

<210> 85  
<211> 92  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 85  
ggtgtcgatt ccagccaccc agtcggtctg cttgggtggtg tagaagttag cagcacactt 60  
cacacactca gaagcagcct gcttgtaggt ag 92

<210> 86  
<211> 92  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 86  
gggtggctgg aatcgacacc tgtacctt gtaacaagaa gctgacctct ggagctgagg 60  
ctaacctgcc tgagtctgct aagaagaaca tc 92

<210> 87  
<211> 95  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
oligonucleotide primers

<400> 87  
gagggatcct tattacagca ggtagtaaga gatcagcagc agagagatag acaggaagtt 60  
agcgaaagtca cactggatgt tcttcttagc agact 95

<210> 88  
 <211> 52  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: repeating  
 primary structure motif

<220>  
 <221> UNSURE  
 <222> (2)..(3)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (5)..(24)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (26)..(28)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (31)..(48)  
 <223> amino acid

<220>  
 <221> UNSURE  
 <222> (50)..(51)  
 <223> amino acid

<400> 88  
 Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 1 5 10 15  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Cys Pro Xaa Xaa  
 20 25 30  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 35 40 45  
 Cys Xaa Xaa Cys  
 50

<210> 89  
 <211> 58  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: repeating  
 primary structure motif

<220>  
 <221> UNSURE  
 <222> (2)..(3)  
 <223> amino acid

<220>  
<221> UNSURE  
<222> (5)..(24)  
<223> amino acid

<220>  
<221> UNSURE  
<222> (27)..(29)  
<223> amino acid

<220>  
<221> UNSURE  
<222> (32)  
<223> amino acid

<220>  
<221> UNSURE  
<222> (35)..(54)  
<223> amino acid

<220>  
<221> UNSURE  
<222> (56)..(57)  
<223> amino acid

<400> 89  
Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5 10 15  
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gln Cys Xaa Xaa Xaa Cys Pro Xaa  
20 25 30  
Gly Thr Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
35 40 45  
Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa Xaa Cys  
50 55

<210> 90  
<211> 16  
<212> PRT  
<213> Ichthyophthirius multifiliis

<400> 90  
Met Lys Tyr Asn Ile Leu Leu Ile Leu Ile Ile Ser Leu Phe Ile Asn  
1 5 10 15

<210> 91  
<211> 16  
<212> PRT  
<213> Ichthyophthirius multifiliis

<400> 91  
Met Lys Asn Asn Ile Leu Val Ile Leu Ile Ile Ser Leu Phe Ile Asn  
1 5 10 15

<210> 92  
<211> 12  
<212> PRT  
<213> Ichthyophthirius multifiliis

<400> 92

Cys Pro Thr Gly Thr Ala Leu Asp Asp Gly Val Thr  
1 5 10

<210> 93

<211> 13

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 93

Cys Val Lys Cys Lys Pro Asn Phe Tyr Tyr Asn Gly Gly  
1 5 10

<210> 94

<211> 12

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 94

Cys Val Lys Cys Arg Leu Asn Phe Tyr Tyr Asn Gly  
1 5 10

<210> 95

<211> 11

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 95

Cys Pro Ala Gly Thr Val Leu Asp Asp Gly Thr  
1 5 10

<210> 96

<211> 11

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 96

Cys Pro Ala Gly Thr Val Leu Thr Asp Gly Thr  
1 5 10

<210> 97

<211> 19

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 97

Ala Gly Thr Asp Thr Cys Thr Glu Cys Thr Lys Lys Leu Thr Ser Gly  
1 5 10 15

Ala Thr Ala

<210> 98

<211> 19

<212> PRT

<213> Ichthyophthirius multifiliis



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<400> 98

Ala Gly Ile Asp Thr Cys Thr Ser Cys Asn Lys Lys Leu Thr Ser Gly  
1 5 10 15

Ala Glu Ala

<210> 99

<211> 17

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 99

Phe Ala Lys Phe Leu Ser Ile Ser Leu Leu Phe Ile Ser Phe Tyr Leu  
1 5 10 15

Leu

<210> 100

<211> 17

<212> PRT

<213> Ichthyophthirius multifiliis

<400> 100

Phe Ala Asn Phe Leu Ser Ile Ser Leu Leu Leu Ile Ser Tyr Tyr Leu  
1 5 10 15

Leu

<210> 101

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: short linker  
sequence

<400> 101

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Ser  
1 5 10

<210> 102

<211> 1410

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: synthetic  
55kD i-antigen coding region

<400> 102

atgaagaaca acatcctggt gatcctgatc atctctctgt tcatcaacca gatcaagtct 60  
gctaactgtc ctgtgggaac cgagaccaac accgctggac aggtggacga cctgggaacc 120  
cctgctaact gtgtgaactg tcagaagaac ttctactaca acaacgctgc tgctttcgtg 180  
cctggagactt ctacctgtac cccttgcct cagaagaagg acgctggagc tcagcctaac 240

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cctcctgcta	ccgctaacct	ggtgaccag	tgtaacgtga	agtgtcctgc	tggaaccgct	300
atcgctggag	gagctaccga	ctacgctgct	atcatcaccg	agtgtgtgaa	ctgtcgcac	360
aacttctaca	acgagaacgc	tcctaacttc	aacgctggag	cttctacctg	taccgcttgt	420
cctgtgaacc	gcgtgggagg	agctctgacc	gctggaaaacg	ctgctaccat	cgtggctcag	480
tgtaacgtgg	cttgtcctac	cggaaccgct	ctggacgacg	gagtgaccac	cgactacgtg	540
cgctctttca	ccgagtgtgt	gaagtgtcgc	ctgaacttct	actacaacgg	aaacaacgga	600
aacacccctt	tcaaccctgg	aaagtctcag	tgtacccctt	gtcctgctat	caagcctgct	660
aacgtggctc	aggctaccct	gggaaacgac	gctaccatca	ccgctcagt	taacgtggct	720
tgtcctgacg	gaaccatctc	tgctgctgga	gtgaacaact	gggtggctca	gaacaccgag	780
tgtaccaact	gtgctcctaa	cttctacaac	aacaacgctc	ctaacttcaa	ccctggaaac	840
tctacctgtc	tgcttgtcc	tgctaacaag	gactacggag	ctgaggctac	cgctggagga	900
gctgctaccc	tggtctagca	gtgtaacatc	gcttgtcctg	acggaaccgc	tatcgcttct	960
ggagctacca	actacgtgat	cctgcagacc	gagtgtctga	actgtgctgc	taacttctac	1020
ttcgacggaa	acaacttcca	ggctggatct	tctcgtgta	aggcttgtcc	tgctaacaag	1080
gtgcagggag	ctgtggctac	cgctggagga	accgctaccc	tgatcgctca	gtgtgctctg	1140
gagtgtcctg	ctggaaccgt	gctgaccgac	ggaaccacct	ctacctacaa	gcaggctgct	1200
tctgagtgtg	tgaagtgtgc	tgctaacttc	tacaccacca	agcagaccga	ctgggtggct	1260
ggaatcgaca	cctgtacctc	ttgtaacaag	aagctgacct	ctggagctga	ggctaacctg	1320
cctgagtctg	ctaagaagaa	catccagtgt	gacttcgcta	acttcctgtc	tatctctctg	1380
ctgctgatct	cttactacct	gctgtaataa				1410